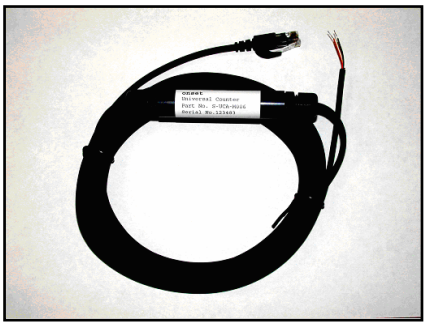
Pulse Input Adapters (Part # S-UCA/B-M006)

The Pulse Input Adapters are used to log the number of switch closures per interval and are designed to work with the HOBO® Weather Station and Micro Station data loggers. The adapter has a plug-in modular connector that allows it to be added easily to the Weather Station or Micro Station. Two versions are available for easy interfacing with either mechanical contact closures or solid-state electronic switches. The contact closure version is ideal for connecting to tipping-bucket rain gauges.



Specification	Pulse Input Adapter	
	S-UCA-M006 for Electronic Switches	S-UCB-M006 for Contact Closures
Maximum Input Frequency	120 Hz (120 pulses per second)	2 Hz (2 pulses per second)
Measurement Range	0 – 4093 pulses per logging interval	
Resolution	1 pulse	
Lockout time	45 µs ± 10%	327 ms ± 10%
Recommended Input Type	Electronic solid state switch closure or CMOS-level digital output (example: FET, opto-FET or open collector)	Mechanical contact closure (example: reed switch in a tipping bucket rain gauge)
Preferred Switch State†	Active low input	Normally open
Edge Detection	Falling edge, Schmitt Trigger buffer (logic levels: low ≤ 0.6 V, high ≥ 2.7 V)	
Minimum Pulse Width	1 ms	
Input/Output Impedance	100 KΩ	
Open Circuit Input Voltage	3.3 V	
Maximum Input Voltage	3.6 V	
User Connection	24 AWG wires, 2 leads: white(+), black(-)	
Operating Temperature Range	-40° to 75°C (-40° to 167°F)	
Overall Cable Length	6.5 m (21 ft.)	
Housing	Weatherproof PVC housing protects input adapter electronics	
Housing Dimensions	14 x 0.95 cm (5.5 x 0.375 in.)	
Weight	310 g (11 oz.)	
Bits per Sample	12	
Number of Data Channels *	1	
Measurement Averaging Option	No (reports the number of pulses over the logging interval)	
Length of Smart Sensor Network Cable	50 cm (1.6 ft.)	
Part Number	S-UCA-M006	S-UCB-M006

* A single HOBO Weather Station can accommodate 15 data channels and up to 100 m (328 ft.) of network cable (the digital communications portion of the input adapter and smart sensor cables). A single HOBO Micro Station can accommodate 4 data channels.

† For maximum battery life, the Pulse Input Adapters should be used with their preferred switch type. The adapters will work with active high inputs (S-UCA) and normally closed switches (S-UCB), but battery life will not be optimized.

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Part #: MAN-S-UCA/B
Doc #: 8129-A

Inside this package

- Pulse Input Adapter
- 2 wire nuts

Connecting the Input Adapter

Typical Setup

The adapter housing should be installed outside the logger enclosure. Be sure to follow the instructions included with the logger to ensure that the logger is properly sealed where the sensor cable exits the logger enclosure. Secure the adapter housing to the mast or sensor mounting arm. Excess cable should be coiled and secured with cable ties.

When making a connection to a third-party sensor, take time to make sure that the connection is reliable. The connection should be protected from rain, dirt, and direct exposure to the elements. The input cable can be connected directly to screw terminals on the sensor or to sensor cables with the included wire nuts.

To use the wire nuts, strip about 1 cm (3/8") of insulation from the end of wires, taking care not to nick the metal conductors. Then, twist the stripped wires together clockwise and then screw on the wire nut clockwise. Check the connection by gently pulling on the wires to verify a solid mechanical connection. Always strain-relief the connection to make sure that the connection is not broken by being jerked or repeatedly worked back and forth.

Installation Considerations

- If sensor cables are left on the ground, use a conduit to protect against animals, lawn mowers, exposure to chemicals, etc.
- Refer to the *HOBO Weather Station User's Guide* or the *HOBO Micro Station User's Guide* for information about setting up complete stations.

Input Connections

The Pulse Input Adapter sensor has two input connections. The white wire (+) is powered at 3.3 V through a 100 KΩ resistor. This power is supplied from the logger's battery. The black wire (-) is connected through the adapter to the logger's ground connection.

Typical Setup of S-UCB-M006 with a Tipping Bucket Rain Gauge or Mechanical Contact Switch

The Contact Closure Pulse Input Adapter (S-UCB-M006) is designed to work with Tipping Bucket Rain Gauges and other devices with normally open, mechanical contact closure, switched outputs with a maximum pulse frequency of 2 Hz. This sensor has a pre-set lockout time of 327 ms and is designed to work with signals that must be de-bounced to be accurately measured.

Note

- "Bounce" is a phenomenon where a single pulse may contain several false pulses or bounces. De-bouncing a signal is typically required when measuring signals from mechanical switches, contact closures, and reed switches.)

The lockout time prevents bounce-induced false pulses from being counted as separate switch closures. If your gauge has a counter display and battery, disconnect them and connect the Pulse Input Adapter in their place. In most cases, the black and white wires can be connected directly to the relay output. (When

connecting to relay or switch contacts, polarity does not matter.) A typical setup for connecting a sensor with a mechanical switch output is shown below.

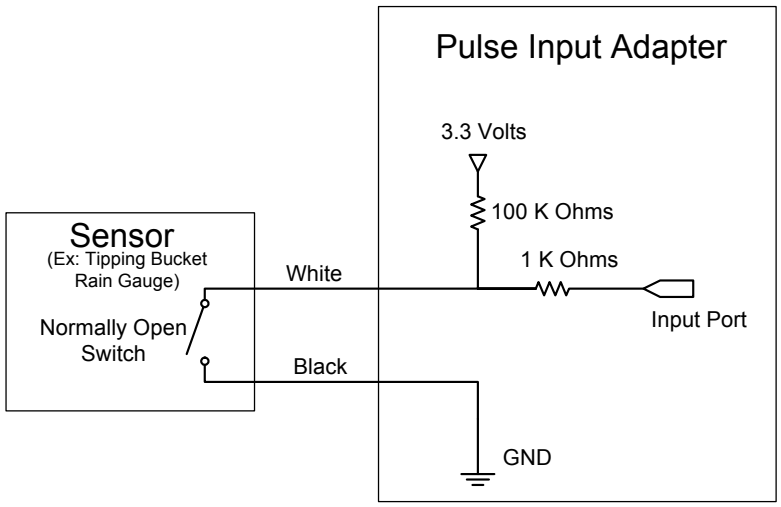

Figure 1: 2 Hz Pulse Input Adapter (S-UCB-M006) connected to a device that has a mechanical contact closure output

Typical Setup of S-UCA-M006 with a FET Switch Transducer

The 120 Hz Pulse Input Adapter (S-UCA-M006) is designed for devices with a normally open solid-state switch, FET switch or open collector, with a maximum pulse frequency of 120 Hz. This input adapter will not work with sensors that have mechanical switch outputs, AC outputs, or outputs that must be de-bounced (see above). A typical setup of a FET switch transducer is shown below.

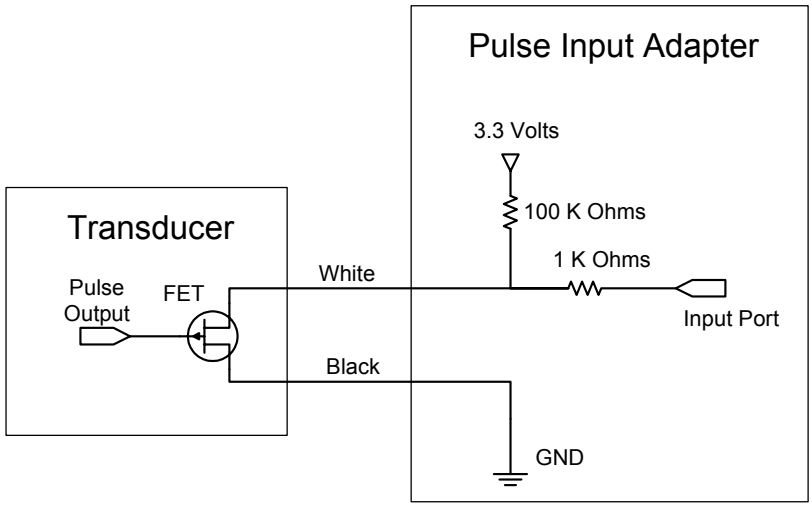

Figure 2: 120 Hz Pulse Input Adapter (S-UCA-M006) connected to a device that has a FET switch output

Note

- The Pulse Input Adapters consume about 1 µA of current with the input high (switch open) and about 33 µA with the input low (switch closed). For maximum logger battery life, use the Pulse Input Adapters with normally open switches or with transducers that have a duty cycle of 90% or higher.

Connecting to the Logger

To start using the Pulse Input Adapter, stop the logger and insert the adapter's modular jack into an available sensor connection port on the logger. If no port is available, use a 1-to-2 sensor connection adapter (Onset Part # S-ADAPT), which allows you to plug two sensors into one port on the HOBO Weather Station only. (The HOBO Weather Station supports a maximum of 15 data channels and 15 sensor ports. The HOBO Micro Station supports a maximum of 15 data channels and 4 sensor ports and cannot be expanded with the 1-to-2 adapters.)

The logger automatically detects the new input adapter the next time you launch it. Launch the logger and verify that the Pulse Input Adapter is functioning correctly. See the *HOBO Weather Station User's Guide* for more details about connecting HOBO smart sensors to the HOBO Weather Station.

Verifying Functionality

To verify proper operation of the Pulse Input Adapter, connect the adapter to a logger and launch the logger. With the logger launched, enter a known number of pulses (for example, if using a tipping-bucket rain gauge, tip the bucket several times). Then read out the logger and verify that the number of pulses in the data file is correct.

If you think that the Pulse Input Adapter is not capturing pulses, check the connections to the adapter and verify that the device being measured is functioning normally. If you believe the adapter is not working properly, you can send the adapter back to Onset for repair. Contact Onset or your Onset Authorized Dealer for a Return Merchandise Authorization (RMA) number.

Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of original purchase. During the warranty period, Onset will, at its option, either repair or replace products that prove to be defective. This warranty is void if the Onset products have been damaged by customer error or negligence, or if there has been an unauthorized modification.

Tune-up Service

Onset will examine and retest this or any other smart sensor or input adapter. A tune up fee may be charged.

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